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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/502,104

09/19/2005

Dror Shemesh

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12/28/2009

APPLIED MATERIALS, INC.

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EXAMINER

JOHNSTON, PHILLIP A

ART UNIT

PAPER NUMBER

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MAIL DATE

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/502,104	<b>Applicant(s)</b> SHEMESH ET AL.	
	<b>Examiner</b> PHILLIP A. JOHNSTON	<b>Art Unit</b> 2881	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 08 October 2009.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-5,9-15,17 and 19-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5,9-15,17 and 19-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 September 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)         | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)         | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                          |

***Detailed Action***

1. This Office Action is submitted in response to the RCE/Amendment filed 10-8-2009, wherein claims 1, 4, 13, 14 and 19 have been amended. Claims 1-5, 9-15, 17 and 19-21 are pending.

***Examiners Response to Arguments***

2. Regarding the applicants argument that the previously applied references fail to teach the newly amended limitation, the teaching is provided by the new reference USPN 5,939,720 to Todokoro. See the rejection below.

***Claims Rejection - 35 U.S. C. 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-3, 5, 9, 13-15, 17, 19 and 20 are rejected under 35 U.S.C. 102 (b) as being anticipated by Todokoro, USPN 5,939,720.

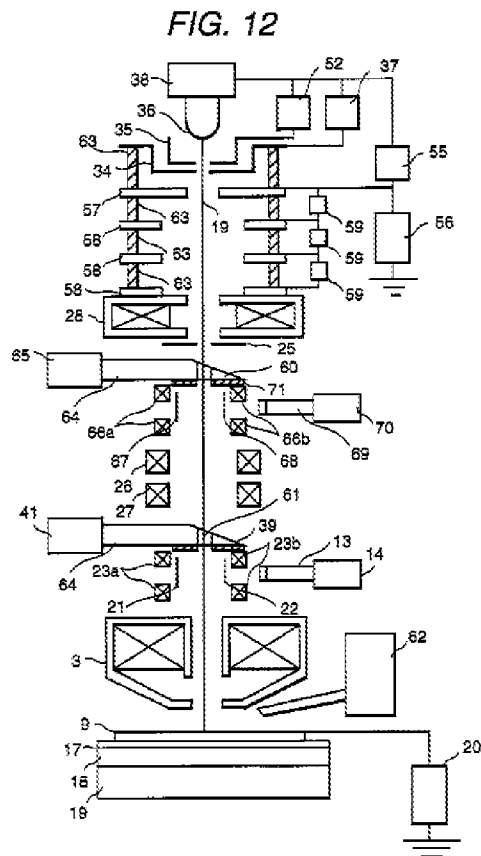
5. Regarding claim 13, Todokoro discloses a scanning electron microscope shown in Figure 5 below including;

(a) Primary electron beam 19 and a column through which the beam propagates along an axis to sample 9. See Col. 14, line 41-64,

(b) Impinging the primary beam on sample 9 to generate low energy secondary electrons and high energy reflected electrons which are extracted (directed) into an aperture of the objective lens by the electric field applied across the objective lens 3. Col. 15, line 17-25,

(c) In-lens detector assembly 39, 14 detects low energy secondary electrons and high energy reflected electrons that have been scattered (the first portion) by the lens action of the objective lens causing a reduced energy,

(d) Inner-lens assembly 71, 70 detects the high energy reflected electrons not scattered (the second portion) by the lens action of the objective lens and passing through the opening 61, such that the reflected electrons are coincident with the beam (optical) axis.



6. Regarding claim 1, Todokoro discloses the apparatus used in this method claim, as pointed out above regarding claim 13.

7. Regarding claims 2, 3, 14 and 15, Todokoro discloses at Col. 14, line 41-67 applying a negative superimposed voltage of -4KV between ground and the sample 9 (a first low voltage potential difference at the first portion of the column located nearest the sample), and applying an acceleration voltage of 5kV between ground and electrode 57 (a second higher voltage potential difference between a second portion of the column farthest from the sample). See Figure 12 above.

8. Regarding claims 5 and 17, Todokoro teaches the use of different detector collection zones. See Col. 13, line 37-54.

9. Regarding claims 9 and 19, Todokoro teaches the inspected object is positioned within the substantial electrostatic lens field. Col. 6, line 3-9.

10. Regarding claim 20, Todokoro (720) teaches using a stage capable of tilting the sample, while efficiently detecting secondary and reflected electrons from the sample surface at Col. 11, line 64-67 and Col. 12, line 1-9.

### ***Claims Rejection – 35 U.S.C. 103***

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. Claims 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over USPN 5,939,720 to Todokoro, in view of Todokoro, USPN. 6,084,238.

Regarding claims 10 and 11, Todokoro (720) teaches the apparatus used in these method claims as described above regarding claim 1, but fails to teach determining a measurement angle that ranges between acute angles and obtuse angles.

Todokoro (238) discloses using a sample stage having an inclining mechanism for tilting the sample and measuring the inclination in advance at Col. 14, line 5-48.

In addition, one of ordinary skill in the art recognizes that a sample stage having the inclining mechanism taught in Todokoro (238) includes the ability to adjust the angle of incidence between acute and obtuse angles, which is the predictable use of such a stage mechanism according to its established function.

Todokoro (238) modifies Todokoro (720) to provide a sample tilting mechanism for varying the angle of incidence of the beam on a sample.

Todokoro (720) teaches using a stage capable of tilting the sample, while efficiently detecting secondary and reflected electrons from the sample surface at Col. 11, line 64-67 and Col. 12, line 1-9.

Therefore it would have been obvious to one of ordinary skill in the art that Todokoro (720) would use the tilting mechanism of Todokoro (238) to enable a sample to be tilted in order to change the observing position on the sample without adversely effecting secondary electron detection efficiency thereby providing a scanning image that shows the shape and composition of the surface of the sample with high resolution. Col. 1, line 9-17 and Col. 14, line 40-48.

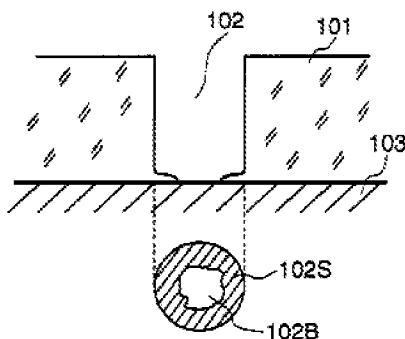
13. Claims 4, 12 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over USPN 5,939,720 to Todokoro, in view of Todokoro, USPN. 6,635,873.

14. Regarding claims 4, 12, and 21, Todokoro (720) discloses the apparatus and method for detecting high and low energy electrons generated by exposure of a sample to an incident electron beam as described above regarding claims 1 and 13.

Todokoro (720) fails to disclose processing the received detection signals to provide an indication about a defect or a process variation; and wherein detected electrons include electrons from a lower portion of a high aspect ratio hole.

15. Todokoro (873) teaches using a scanning electron microscope to observe residue at the bottom of a high aspect ratio contact hole. See Figure 14b below; Col. 2, line 8-18; and Col. 5, line 39-49.

**FIG. 14B**



16. Todokoro (873) modifies Todokoro (720) to provide a scanning electron microscope to observe the shape of the bottom of a contact hole in a wafer processed in the semiconductor industry.

17. Todokoro (720) teaches imaging samples to inspect shapes on a silicone wafer that is processed in the semiconductor industry at Col. 1, line 41-56.

18. Therefore it would have been obvious to one of ordinary skill in the art that Todokoro (720) would use the contact hole imaging technique of Todokoro (873) to provide a scanning

electron microscope for observing the bottom of a contact hole formed on an observation sample such as an IC. Col. 1, line 63-67 and Col. 2, line 1-18.

***Conclusion***

19. Any inquiry concerning this communication or earlier communications should be directed to Phillip Johnston whose telephone number is (571) 272-2475. The examiner can normally be reached on Monday-Friday from 7:00 am to 4:00 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiners supervisor Robert Kim can be reached at (571)272-2293. The fax phone number for the organization where the application or proceeding is assigned is 571 273 8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

PJ

December 19, 2009

/Phillip A Johnston/

Examiner, Art Unit 2881



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